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ARMY DIRECT SUPPORT SYSTEM ANALYSIS

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OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE

DEPARTMENT OF DEFENSE
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DLA-LO

FOREWORD

This is an analysis of the Army Direct Support System (DSS) performance standards to determine the impact of applying those standards to DSS shipments originating at Defense Logistics Agency (DLA) managed supply depots. We gave special attention to the impact on depot and transportation operations and costs. Overall, we found that changes in DLA procedures to meet DSS standards would substantially increase depot operating and transportation costs.

The study was conducted for the DLA Directorate of Supply Operation, Transportation Division (DLA-OT). I wish to thank Mr. Don Neri, DLA Directorate of Supply Operations, Depot Operations Division, Operations and Systems Branch (DLA-OWO), for his help in assessing the impact of DSS standards on the DLA depots. I also wish to thank Mr. Craig Emert, DLA Directorate of Supply Operations, Transportation Division, Regional Freight Consolidation Center Program Office (DLA-OTC), for his assistance in determining the pipeline costs.

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EXECUTIVE SUMMARY

This is an analysis of the United States Army Direct Support System (DSS) performance standards to determine the impact of applying those standards to DSS shipments originating at Defense Logistics Agency (DLA) managed supply depots. The analysis is limited to the six traditional DLA supply depots located at Mechanicsburg, PA, Columbus, OH, Richmond, VA, Memphis, TN, Ogden, UT, and Tracy, CA.

The Army identifies individual units as DSS activities which require a different level of depot support. The DSS time standard requires an average order-ship-time (OST) of 7 days from requisition receipt at the depot for shipments to points in the Continental United States (CONUS). Under current Uniform Materiel Movement and Issue Priority System (UMMIPS) standards, DLA depots have a 21 day OST standard for CONUS shipments. Changes to DLA's current method of handling requisitions for DSS units would impact both depot and transportation operations and costs.

A simulation model was used to determine the estimated cost and operational effectiveness associated with four different scenarios; (1) the current method of operations or BASELINE, includes depot processing at the Issue Priority Group (IPG) 3 level and shipping surface freight, (2) depot processing at the IPG 3 level with second day air transportation for destinations over 400 miles and surface transportation for destinations 400 miles and under, (3) depot processing at the IPG 1 level and shipping surface freight, and (4) depot processing at the IPG 1 level with second day air transportation for destinations over 400 miles and surface transportation for destinations 400 miles and under.

We recommend that DLA maintain the level of service currently provided to Army DSS customers. While the approach does not meet current DSS standards, it is equivalent to the performance of

former Army depots prior to DLA ownership[1]. As a no cost alternative, the Army should consider adjusting DSS objectives to match present performance.

Since the Army derives important operational benefits from DSS, DLA can respond by offering a proposal to meet the current requirement. DSS requisitions can be processed through the depot without banking for consolidation (processed as IPG 1) and shipped via surface transportation. This approach attains DSS objectives at an estimated additional cost of $5 million annually. If this strategy is selected, we recommend adding a one day bank to the depot processing phase. The limited bank provides more visibility and flexibility in depot workload planning, while still attaining DSS standards.

Additional costs associated with implementation of DSS standards should not be subsidized by all DLA customers through increased surcharges. Instead, we recommend the Army be given the opportunity to request a premium level of service and bear the cost of the desired product. The Army is in the best position to balance the operational benefits of a DSS standard against the associated cost.

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[1] Ann Thrash Vogt, "Technical Report No. 476 Direct Support System (DSS)/Air Line of Communication (ALOC)," November 1989, Abderdeen Proving Ground, MD: U. S. Army Material Systems Analysis Activity, pp. 8-9.

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SECTION 1
INTRODUCTION

1.1 BACKGROUND

The Defense Logistics Agency (DLA) Directorate of Supply Operations, Transportation Division (DLA-OT), requested a study to estimate the impact on depot and transportation operations caused by implementing the United States Army Direct Support System (DSS) performance standards for designated Army units located in the Continental United States (CONUS). This request was based on Army's insistence that DLA provide service to DSS units under the more restricted DSS standards. The study was limited to the six traditional DLA supply depots located at Mechanicsburg, PA, Columbus, OH, Richmond, VA, Memphis, TN, Ogden, UT, and Tracy, CA. The three former Army Area Oriented Depots (AOD) located in New Cumberland, PA, Texarkana, TX, and Lathrop, CA, are used for performance comparisons between DLA and Army operations.

The DSS was implemented by the Army as a standard distribution system for designated Army units to provide for 7 day processing and delivery of routine requisitions for materiel in supply classes II (clothing, individual equipment, tools, and administrative supplies), III (packaged petroleum only), IV (construction materials), V (missile components only), VII (major end items), VIII (medical items), and IX (repair parts). DSS was designed to provide for direct delivery of shipments from Army CONUS wholesale warehouses to the various Army supply support activities (SSAs). Army objectives for DSS are (1) to improve supply system responsiveness through reduced order-ship-time (OST), (2) to reduce or eliminate intermediate level inventory, thereby reducing costs, (3) to meet Department of the Army (DA) objectives on visibility of requisitions and intransit materiel, (4) to meet materiel readiness objectives at the lowest cost to the Department of Defense (DoD), and (5) to operate in peacetime

the same supply distribution system that will be used in wartime, requiring minimal transitional changes.

Since implementation of DSS, customer support has been provided through three CONUS distribution depots; Sharpe Army Depot (AD), Lathrop, CA, Red River AD, Texarkana, TX, and New Cumberland AD, New Cumberland, PA. These depots were operated under the Army AOD concept which involved each AOD serving a separate CONUS region made up of a block of adjacent states. DA policy called for its National Inventory Control Points (NICPs) to position stocks in the AODs in such a manner that would minimize transportation costs, take advantage of faster depot processing time, and reduce intransit time to the customer. The AODs received the majority of routine materiel requisitions from units within their defined service areas.

DLA currently operates under the Uniform Materiel Movement and Issue Priority System (UMMIPS) which allows 21 days for delivery of routine requisitions. All military services freight is processed in the same manner. Every effort is made to use the total time allotted to maximize consolidation of requisitions into large shipping units to keep depot operating and transportation costs as low as possible. Exception processing for high priority items such as for DSS units is kept at a minimum to reduce the disruption to the depot process and keep operational costs down. In contrast, Army AODs were given an average OST of 7 days from the date the requisition was received at the depot to the date of delivery to the appropriate SSA. This policy allowed for limited consolidation since requisitions moved directly through the depot process with limited potential for consolidation. However, the Army partially compensated for the lack of consolidation by stocking most of the materiel needed by its units in the AOD closest to the unit. Changes to DLA's current method of handling requisitions for DSS units would impact both depot and transportation operations and costs.

1.2 SCOPE

The following items define the scope of the analysis:

(1) Only CONUS DSS designated activities are used to analyze the impact on DLA to transition from UMMIPS to DSS standards. All depot customers are used to develop depot processing and transit time distributions for the simulation. See Appendix B - "DSS Units" for a listing of the DSS units used in the analysis.

(2) A 6-month period from July 1991 through December 1991 is used in the analysis. Data comes from the DLA Materiel Release Order (MRO) History file and the U. S. Army's Logistics Intelligence File (LIF).

(3) Changes in stock positioning policy such as "closest to vendor" are not modeled. Stock positioning is modeled as reflected in the MRO History and LIF files.

(4) Only Issue Priority Group (IPG) 3 and non-subsistence requisitions are analyzed.

(5) OST is measured from the date the requisition is transceived to the depot to the date it is received at the customer.

(6) The DLA depots reviewed in the analysis are:

a. Defense Distribution Depot Susquehanna, PA (DDSP) - Mechanicsburg Site (formerly Defense Depot Mechanicsburg, PA (DDMP)).

b. Defense Distribution Depot Richmond, VA (DDRV).

c. Defense Distribution Depot Columbus, OH (DDCO).

d. Defense Distribution Depot Memphis, TN (DDMT).

e. Defense Distribution Depot Ogden, UT (DDOU) - Ogden Site (formerly Defense Depot Ogden, UT (DDOU)).

f. Defense Distribution Depot San Joaquin, CA (DDSC) - Tracy Site (formerly Defense Depot Tracy, CA (DDTC)).

(7) The ex-Army depots used for comparison are:

a. DDSP New Cumberland Site (formerly New Cumberland AD), New Cumberland, PA.

b. DDSC Lathrop Site (formerly Sharpe AD), Lathrop, CA.

c. Defense Distribution Depot Texarkana (formerly Red River AD), Texarkana, TX (DDTT).

1.3 CONSTRAINTS

The following are constraints on the analysis:

(1) Only requisitions destined for Army CONUS DSS units originating at the six DLA depots identified in 1.2(6) are evaluated.

(2) The DLA depots identified in 1.2(6) are limited to operating under DLA Warehousing and Shipping Procedures (DWASP) system which is not currently set up to handle the specialized processing needed for DSS requisitions.

1.4 OBJECTIVE

The objective of this study is to provide an estimate of the impact on depot and transportation operations and costs caused by implementing the Army's DSS standards for materiel going to CONUS DSS units serviced by DLA. Specifically, the following four scenarios are evaluated:

(1) IPG 3 depot processing level with surface transportation (hereinafter referred to as the BASELINE scenario);

(2) IPG 3 depot processing level with second day air transportation for destinations over 400 miles and surface transportation for the remaining destinations;

(3) IPG 1 depot processing level with surface transportation; and,

(4) IPG 1 depot processing level with second day air transportation for destinations over 400 miles and surface transportation for the remaining destinations.

In addition, the impact of the above scenarios on the Army's pipeline cost is calculated.

SECTION 2
METHODOLOGY

A simulation model is used to estimate the differences in cost and OSTs between the BASELINE (DLA's current operating scenario) and the various scenarios that may meet or approach meeting DSS standards. Simulation seemed best suited for the analysis since it gave us the ability to generate various scenarios with the historical demand found in the MRO and LIF files. Each scenario consisted of a different combination of depot processing time standards and methods of transportation to find the estimated cost of meeting or coming close to meeting DSS standards.

2.1 DATA DEVELOPMENT

There were three steps involved in building the appropriate requisition set for input to the model. First, all eligible requisitions were identified. Second, the appropriate depot processing and transit times were calculated. Finally, the appropriate depot missed consolidation percentages were defined and calculated.

2.1.1 REQUISITIONS ELIGIBLE

Data were selected from the depot MRO file based on the following criteria:

(1) The item was requisitioned by a DSS unit.

(2) The requisition was routine priority, i.e., IPG 3 or downgraded IPG 1 or 2.

(3) The requisition was not for subsistence.

2.1.2 TOTAL DEPOT PROCESSING TIME

Two sets of depot processing times were generated for each depot. One set for IPG 3 and the other for IPG 1 processing. Each set

contained a composite time representing the total depot processing time from each depot to each geographical area (See Appendix C, Figure C-1, for a map of the applicable geographic areas). Total depot processing time is made up of the sum of the bank time, pick and pack time, and hold time. These times were calculated as follows:

(1) **Bank time** = depot drop date - depot receipt date.

(2) **Pick and pack time** = offer to transportation date - depot drop date.

(3) **Hold time** = ship date - offer to transportation date.

(4) **Total processing time** = ship date - depot receipt date.

A distribution was fitted to each set of processing times using the mean, standard deviation, skewness, and range of the data as a basis. The lognormal distribution appeared to represent the best fit for total processing time.

2.1.3 TRANSIT TIMES

Three different transit times were used in the analysis for each depot to geographic area combination (traffic lane). A fixed transit time of 2 days was set for second day air transportation. Transit times for surface freight were determined through data analysis and were subdivided into categories for truckload (TL) and less-than-truckload (LTI) transportation. Surface freight transit times varied due to the difference in the distances of the various traffic lanes. As with the total processing time, a distribution for transit time was fitted for each traffic lane using the mean, standard deviation, skewness, and range of the data. Depending on the traffic lane, either a normal or lognormal distribution was used to represent transit time.

2.1.4 MISSED CONSOLIDATIONS

The consolidation of shipments within a depot is affected by a number of factors including workload leveling, human error, physical space, etc.. These factors contribute to the fact that the depot consolidation process is less than optimal. In order to capture the dynamics of this phenomena a parameter called the "missed consolidation percentage" (MCP) was created and used in the analysis. The MCP is defined as "the opportunity lost for a unit of freight to be combined with freight going to the same customer on the same day or consecutive days by the same mode of transportation." The MCP was calculated from historical data for each depot to geographical region combination. See Appendix C - "Missed Consolidation Percentages" which contains a complete listing of MCPs by depot and geographic region.

2.2 MODEL DEVELOPMENT

The model is made up of a series of computer programs designed to simulate the depot and transportation process. It was developed for DLA to make comparisons between shipping direct from the depot to customer versus shipping through the Regional Freight Consolidation Centers[1]. The model includes a module that simulates the depot to customer direct shipment process. This direct shipment module was used since it was already developed and needed only slight modifications. The following modifications were required.

2.2.1 ADDITIONAL REGIONS

The size of the model was increased to accommodate all 11 geographic regions in one run. This included loading depot

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[1] Russell S. Elliott and MAJ Charles H. Shaw III, "Model to Analyze Carrier Bids for the Regional Freight Consolidation Center (RFCC) Workload," Project No. DLA-92-P10014, September 1992, Defense Logistics Agency.

processing times and TL and LTL transit times for each geographical region into the model. In addition, the transportation rating programs were modified by increasing the size of the surface transportation rate matrix to include all geographical regions. Two air rate tables were added, one for small air parcel shipments and the other for air freight shipments.

2.2.2 DEPOT PROCESSING

A module was added to model depot processing under the IPG 1 scenarios. The differences between the IPG 3 and IPG 1 processes are as follows:

(1) Total depot processing times differ. IPG 3 requisitions are banked for consolidation whereas IPG 1 requisitions are moved directly through the depot process without banking. IPG 1 requisitions are always processed first before the IPG 3 requisitions. IPG 3 requisitions also have a longer transportation hold time.

(2) IPG 1 requisitions are processed 6 days per week, IPG 3 are processed 5 days. The effect of weekend processing is captured in the depot processing distributions.

2.3 VERIFICATION AND VALIDATION

The model was verified after each run to determine the reasonableness of the results and to see if the model was operating according to design. Validation was accomplished by comparing the results of the model output to actual depot processing data. The number of shipments built by the model was compared to the actual number of DSS shipments from each depot. The model generated 193,122 shipments while the actual number of depot shipments was 209,171, a 7.67 percent difference.

2.4 ADDITIONAL DEPOT PROCESSING COSTS

Additional depot processing costs are experienced when a requisition is processed as IPG 1. These costs include increased labor costs in warehousing and transportation to process the materiel in a timely manner. Increased packaging costs are also a factor. These costs were determined from data provided by the Defense Distribution Region Central, the Defense Distribution Region East, Defense Distribution Depot Susquehanna, the Defense Depot Ogden, and the Defense Distribution Region West in response to DLA, Supply Operations, Depot Operations Division, Operations and Systems Branch (DLA-OWO), request for comments. See Appendix D - "Depot Workload Impact" for DLA-OWO request and responses.

2.5 PIPELINE SAVINGS

Data from the Army Materiel Systems Logistics Control Activity (LCA) report "Dollar Value of the Army Logistic Pipeline Stratified by Major Army Command" is used. This report provides the total Average Daily Dollar Value (ADDV) of inventory in the pipeline for both CONUS and Overseas requisitions. The report is broken down by shipping agency, DSS, non-DSS and source of supply by class. Using the LCA data the ADDV for CONUS DSS units was estimated in the following manner:

(1) The proportion of CONUS ADDV to the Total ADDV was calculated.

(2) The proportion of CONUS DSS ADDV to CONUS Total ADDV was calculated.

(3) The total DLA ADDV by DSS class was calculated.

(4) The CONUS DSS ADDV Pipeline Cost was then calculated by taking the total DLA ADDV by DSS class multiplied by the proportion of CONUS DSS ADDV to CONUS Total ADDV

multiplied by the proportion of CONUS ADDV to the Total ADDV.

The Army's DLA pipeline savings were calculated by applying the ADDV to the reduction of the pipeline in days.

SECTION 3
FINDINGS

This section reports the findings as they relate to the various areas of the analysis. See Appendix I - "Summary Statistics" for significant summary statistics showing the scope of analysis data.

3.1 COST COMPARISONS

The simulation model provides estimates of the costs associated with depot and transportation operations under the various scenarios. Table 3.1 provides a comparison of the additional costs across the scenarios.

Table 3.1. Additional Depot and Transportation Costs (Millions) by Scenario

DEPOT PROCESSING	SURFACE TRANSPORTATION	2ND DAY AIR/SURFACE TRANSPORTATION
IPG 3	BASELINE	$41.3
IPG 1	$4.8	$45.9

Compared to the BASELINE of $8.1 million the estimated additional cost to meet or approach meeting DSS standards ranges from $4.8 million (IPG 1 with Surface Transportation) to $45.9 million (IPG 1 with 2nd Day Air or Surface Transportation). These costs are averages based on ten iterations of the simulation model.

3.2 TOTAL TIME COMPARISONS

The model provides the average total OSTs for each of the four scenarios. Table 3.2 provides a comparison of the reduction in average OST across the scenarios.

Table 3.2. Reduction in Average OST by Scenario (Days)

DEPOT PROCESSING	SURFACE TRANSPORTATION	2ND DAY AIR/SURFACE TRANSPORTATION
IPG 3	BASELINE	-1.5
IPG 1	-8.3	-8.9

Compared to the BASELINE of 14.2 days the estimated reduction in OST after implementation of DSS standards ranges from 8.9 days (IPG 1 with 2nd Day Air or Surface Transportation) to 1.5 days (IPG 3 with 2nd Day Air or Surface Transportation). These times are averages based on ten iterations of the simulation model.

3.3 DLA VS ARMY PERFORMANCE

The Army has requested that DLA adopt the DSS standard of 7 day average OST from the time of depot receip to delivery to the customer for designated DSS units. The analysis shows that DLA performance can be expected to range from approximately 14.2 days to 5.3 days with associated estimated annual costs of from $8.1 million to $54.0 million depending on the scenario. A 1989 Army Materiel Systems Analysis Activity (AMSAA) report[1] shows that for the period reviewed Army AODs averaged 14 days OST to CONUS DSS customers. This is comparable to DLA's current (BASELINE) performance of 14.2 days average OST to CONUS DSS customers. The Army report recommends that the 7 day standard be changed to 10 days[2].

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[1] Ann Thrash Vogt, "Technical Report No. 476 Direct Support System (DSS)/Air Line of Communication (ALOC)," November 1989, Aberdeen Proving Ground, MD: U. S. Army Materiel Systems Analysis Activity, pp. 8-9.

[2] Ibid, pp. 19-20.

3.4 DSS IMPACT ON DLA DEPOTS

Processing DSS requisitions as IPG 3 does not change a depot's normal operating procedure. However, there is an impact when DSS requisitions are processed as IPG 1. For example, the average total lines per day for the six DLA depots from 1 June through 31 December 1991 was 64,802, which includes 9,681 processed as IPG 1. To process DSS requisitions as IPG 1 would result in an increase of 5,369 lines to the number of IPG 1 lines per day or a 55.46 percent increase in the number of IPG 1 lines. Appendix E - "DSS Impact on Depot Workload" breaks the additional IPG 1 workload down by depot.

The increase in number of IPG 1 requisitions processed impacts on depot workload planning. We talked with Mr. John Radford, workload planner for DDRV, in order to get a feel for how the increase in IPG 1 requisitions will impact workload planning. According to Mr. Radford, workload is broken down into two groups of requisitions, uncontrollable and controllable. Uncontrollable requisitions are high priority workload that flows through the depot without banking. The workload planner does not know how many high priority requisitions will be received on a given day. On the other hand, controllable requisitions are routine workload that are used by the workload planner to balance the daily depot workload. This is accomplished by banking routine requisitions and then dropping enough requisitions each day to bring the total requisitions processed for the day up to a predetermined level. For example, say a depot's workload is 10,000 requisitions per day. If 1,500 high priority requisitions must be processed then the workload planner can drop up to 8,500 routine requisitions to balance the workload. Changing routine requisitions to high priority increases the number of uncontrollable requisitions. This increase has a negative impact on workload planning. Mr. Radford suggested that DSS requisitions be banked for 1 day in order to get visibility. This will then give the workload

planner the ability to manage the bank by reducing the number of requisitions free-flowing through the depot.

Additional processing costs are incurred as a result of the increase in the number of IPG 1 requisitions processed. These costs include warehousing labor, packaging, and transportation. Using data provided by the depots, the estimated additional processing costs were calculated. Based on the increase in IPG 1 lines resulting from DSS exception processing, the additional annual costs are estimated to be $4,574,224. Appendix F - "Calculations of Depot Processing Costs" breaks these costs down by depot.

3.5 PIPELINE SAVINGS

Pipeline savings are based on the average daily dollar value of goods being shipped from a depot. The CONUS DSS average daily dollar value was estimated to be $528,279 per day. This is a one time savings when the pipeline is decreased by one day or a one time cost when the pipeline is increased by one day. Appendix H - "Calculation of Pipeline Savings" gives a detailed explanation of how the savings were estimated. Table 3.3 gives a breakdown of the estimated pipeline savings by scenario based on $528,279 per day. The BASELINE represents $0 saved. One-time pipeline savings are computed by multiplying $528,279 by the reduction in average OST days found in Table 3.2.

Table 3.3. One-Time Pipeline Savings By Scenario

DEPOT PROCESSING	SURFACE TRANSPORTATION	2ND DAY AIR/SURFACE TRANSPORTATION
IPG 3	BASELINE	$792,418
IPG 1	$4,384,715	$4,701,683

3.6 OVERALL COSTS

Using the daily average pipeline cost for DSS customers, we projected the net savings for two scenarios: (1) depot processing as IPG 1 and ship surface freight; and (2) depot processing as IPG 1 and ship second day air or surface freight. A summary of the current dollar and a net present value analyses are discussed below. See Appendix H - "Cost Analysis" for a detailed description of our analyses.

3.6.1 IPG 1 PROCESSING AND SURFACE FREIGHT

A one time savings for the IPG 1 processing and surface freight scenario resulting from the reduction in pipeline cost is estimated to be $4.4 million. The annual additional cost to DLA of this scenario is estimated at $4.8 million. In the first year the net cost is $0.4 million with the outyears estimated at $4.8 million each. Current dollar value analysis shows that the 10 year additional cost of this scenario is $43.6 million. Net present value for this scenario over a 10-year period is $31.3 million. Losses begin to accrue at approximately 11 months after implementation of DSS standards.

3.6.2 IPG 1 PROCESSING AND SHIP 2ND DAY AIR OR SURFACE FREIGHT

A one time savings for the IPG 1 processing and second day air/surface scenario resulting from the reduction in pipeline cost is estimated to be $4.7 million. In the first year, the net cost is $41.2 million with the outyears estimated at $45.9 million each. Current dollar value analysis shows that the total 10-year additional cost of this scenario is $454.3 million. Net present value for this scenario over a 10-year period is $337.1 million. Losses begin to accrue during the second month after implementation of DSS standards.

SECTION 4
CONCLUSIONS

Our analysis resulted in the following conclusions:

- DLA currently matches former Army performance.
- The least cost means for DLA to meet DSS standards is to process DSS requisitions as IPG 1 and ship surface freight. Even so, DLA incurs costs substantially higher than current operations.
  - First year additicnal cost to DLA of approximately $0.4 million.
  - Additional annual cost to DLA in outyears approximately $4.8 million per year.
  - Net present value of cost to DLA over a ten year period is $31.3 million.
  - Losses begin to accrue at approximately 11 months after implementation of DSS standards.
- Allowing one day bank time for DSS requisitions will provide visibility for workload planning.

SECTION 5
RECOMMENDATION

As demonstrated earlier in the report, expedited delivery of low priority materiel to Army DSS units can be very costly. Pipeline inventory savings are quickly overwhelmed by the additional depot and transportation expense. However, the accelerated DSS standards provide operational benefits to the Army which should not be overlooked.

We recommend that DLA maintain the level of service currently provided to Army DSS customers. While current DLA operations under UMMIPS do not meet DSS standards, it is equivalent to the performance of former Army depots prior to DLA ownership[1]. As a no cost alternative, the Army should consider adjusting DSS objectives to match present performance.

Since the Army derives important operational benefits from DSS, DLA can respond by offering a proposal to meet the current requirement. DSS requisitions can be moved through the depot process without banking for consolidation (processed as IPG 1) and shipped via surface transportation. This approach attains DSS objectives at an estimated additional cost of $4.8 million annually. If this strategy is selected, we recommend adding a one day bank to the depot processing phase. The limited bank provides more visibility and flexibility in depot workload planning, while still attaining DSS standards.

Additional costs associated with implementation of DSS standards should not be subsidized by all DLA customers through increased surcharges. Instead, we recommend the Army be given the opportunity to request a premium level of service and bear the cost of the desired product. The Army is in the best position to

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[1] Ann Thrash Vogt, "Technical Report No. 476 Direct Support System (DSS)/Air Line of Communication (ALOC)," November 1989, Abderdeen Proving Ground, MD: U. S. Army Material Systems Analysis Activity, pp. 8-9.

balance the operational benefits of a DSS standard against the associated expense.

APPENDIX A

LIST OF ABBREVIATIONS

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Abbreviation	Definition
AD	Army Depot
ALOC	Air Line of Communication
ADDV	Average Daily Dollar Value
AMSAA	U.S. Army Materiel Systems Analysis Activity
AOD	Area Oriented Depot
CONUS	Continental United States
DA	Department of the Army
DDCO	Defense Distribution Depot Columbus, OH
DDHP	Defense Distribution Depot Harrisburg, PA
DDMP	Defense Depot Mechanicsburg, PA
DDMT	Defense Distribution Depot Memphis, TN
DDOU	Defense Distribution Depot Clearfield, UT
DDRV	Defense Distribution Depot Richmond, VA
DDSC	Defense Distribution Depot Stockton, CA
DDTC	Defense Depot Tracy, CA
DDTT	Defense Distribution Depot Texarkana, TX
DLA	Defense Logistics Agency
DLA-OT	DLA, Supply Operations, Transportation Division
DLA-OTC	DLA, Supply Operations, Transportation Division, Consolidation Office
DLA-OWO	DLA, Supply Operations, Depot Operations Division, Operations and Systems Branch
DoD	Department of Defense
DSS	Direct Support System
DWASP	DLA Warehousing and Shipping Procedures
GBL	Government Bills of Lading
IPG	Issue Priority Group
LCA	Logistics Control Activity
LIF	U.S. Army's Logistics Intelligence File
LTL	Less-Than-Truckload
MCP	Missed Consolidation Percentage
MRO	Materiel Release Order
NICP	National Inventory Control Point
OST	Order-Ship-Time
RFCC	Regional Freight Consolidation Center
SSA	Supply Support Activity
TL	Truckload
UMMIPS	Uniform Materiel Movement and Issue Priority System

APPENDIX B

DSS UNITS

APPENDIX B
DSS UNITS

CN0CG0	W17G8Z	W25DLG	W31N1V	W33VS4	W36QYD	W44SFL	W5CSEG
C1GCL7	W17KZ8	W25DLJ	W31PQV	W33VTA	W36RJP	W44UTM	W5CSEH
C1GCL8	W17S14	W25D98	W31RNY	W33V18	W36WIT	W44WNH	W5CSEJ
W11G81	W17818	W25FY5	W31XDK	W33XNY	W36X06	W44XPB	W5CW5K
W11G82	W18G70	W25G83	W32DQR	W33XX4	W37BXH	W45AJU	W5DK52
W11M39	W18JKY	W25KX9	W32DQS	W34GMT	W37HEV	W45B9U	W51HQS
W11M85	W18TXE	W25KYQ	W32DQT	W34GM2	W37HFW	W45CMN	W51HUU
W12L3Z	W22GLE	W25PBG	W32DQU	W34GM7	W37HFX	W45CMU	W51HU2
W13GN5	W22GLF	W25P43	W32DQV	W34NZN	W37HGC	W45CP7	W51HU8
W13GP8	W22G91	W25P44	W32MUV	W34QWM	W37HGD	W45C04	W51HVG
W13GQH	W22MQM	W25R6L	W32NK9	W34QWU	W37JTM	W45C22	W51HX8
W13GQJ	W22PEQ	W26AAA	W32NZX	W34Q23	W37N01	W45GJ4	W51M1D
W13GSE	W22PEW	W26AAS	W32PZR	W34TVC	W37QSE	W45HJW	W51TH7
W13GSU	W22PE4	W26ABX	W32Q9G	W34TVG	W37QSR	W45K0H	W51WKU
W13G8T	W22PLR	W26ADX	W32Q9H	W34TVH	W37V1W	W45K1C	W51WKV
W13G8X	W22PL0	W26AD2	W32UUK	W34UUS	W37V1Y	W45LGC	W51WKW
W13N92	W22QW6	W26AEC	W32UUL	W35BK0	W38HF5	W45NQK	W51WKX
W13N93	W22Q41	W26AHS	W32W8W	W35KTF	W38NCE	W45NQP	W51WKY
W13XUG	W22Q42	W26AJL	W32XRQ	W35KT5	W38NDM	W45NQ7	W51WKZ
W14G8V	W22RGJ	W26AK3	W33BMA	W35KT6	W38NDP	W45NRV	W52CDE
W14KUL	W22RGN	W26ALP	W33BQ9	W35KUB	W38N1W	W45NSU	W52C2N
W14ULX	W22RZ8	W26AL2	W33BS8	W35PZP	W38PC0	W45PSH	W52C46
W14ULY	W22SU3	W26CC8	W33BTH	W35PZQ	W38PC1	W45QD8	W52D80
W15AQ4	W23A33	W26DHV	W33BU8	W35QWV	W38PC2	W45QML	W52D85
W15A9V	W23A35	W26DHZ	W33BVA	W35W7F	W38TCE	W45RNS	W52EZ1
W15A9X	W23A71	W26DKA	W33BVB	W36B48	W4DSYL	W45RS2	W52JUD
W15BBU	W23A76	W26DKL	W33DL5	W36B5Q	W41PUZ	W45U0W	W52P1C
W15JB9	W23A97	W26HG8	W33DMJ	W36B58	W41RAA	W45WK9	W52WNG
W15MCC	W23FVY	W26L8F	W33FSL	W36B6B	W41XN4	W45WLA	W53C4K
W15RAV	W23HAP	W26RKT	W33JWH	W36B6C	W42CW1	W4545D	W53PIL
W15RAW	W23P47	W26RK4	W33JYF	W36B6E	W42CW2	W4545E	W53T0B
W16BCT	W23P5A	W26R6U	W33K09	W36FDN	W42CXC	W4545H	W54CJX
W16BCV	W23R7B	W26UDN	W33M7W	W36F8U	W42KDF	W4546B	W54KFQ
W16BEC	W23XV6	W26UDU	W33M8Q	W36GKG	W42LGJ	W4546D	W54P3M
W16BEM	W24CJJ	W26WVV	W33NK6	W36GKH	W42LHD	W4546F	W54XB5
W16BEN	W24L9M	W26XRX	W33NYN	W36HUG	W42N6L	W4546G	W54XB9
W16BES	W24Q4Z	W27AVU	W33NYU	W36LJ3	W42SU8	W4546K	W55CST
W16BE0	W24Q40	W27AVV	W33N7L	W36LJ7	W42TCX	W4546L	W55CSY
W16BE3	W24TK2	W27AVW	W33PTK	W36LKG	W42UUE	W4547A	W55CUK
W16BE4	W24TK4	W27LHF	W33QW7	W36LKH	W42WGD	W4547E	W55CUM
W16BE7	W25AR4	W27L8R	W33Q96	W36LKJ	W42WRQ	W4547F	W55CVC
W16CJV	W25AR5	W31BJV	W33RBR	W36N0S	W42XRN	W4547G	W55CWD
W16DDS	W25AR6	W31BJ0	W33RBS	W36N0T	W43J2J	W5ALXU	W55EHC
W16DDT	W25AR7	W31BMW	W33RPM	W36N0U	W43MYP	W5ALXV	W55EHD
W16DDU	W25AVK	W31BM3	W33RP1	W36N0V	W44AAY	W5BHS1	W55EHE
W16H21	W25AXX	W31BM6	W33RQN	W36N0W	W44B0G	W5BM2T	W55GN0
W16JFP	W25AYS	W31BNV	W33RQT	W36N4S	W44DQ1	W5BTUD	W55GN2
W16JG5	W25AY5	W31LPS	W33SMW	W36N4U	W44DUC	W5CD3D	W55GPJ
W16NW1	W25AZW	W31LPT	W33SMX	W36N4V	W44DUD	W5CK4N	W55JBK
W16PBU	W25BDV	W31LPY	W33SMY	W36N4W	W44DUF	W5CK4P	W55JDE
W16PB4	W25DKV	W31NWR	W33S0W	W36PO7	W44DUH	W5CRZU	W55NS0
W16RS5	W25DKW	W31N1H	W33TLB	W36QP5	W44DUL	W5CR5E	W55PH5
W16XT8	W25DK0	W31N1U	W33U0R	W36QYB	W44KN3	W5CSED	W55QE9

W55RHF	W62MF7	W73GK3	W80RGG	W805BR
W55SFU	W62MGH	W73G3L	W80RM4	W805D7
W55VZJ	W62MH3	W73HYR	W80SKX	W805LL
W55VZK	W62MH4	W73RE0	W80SK5	W806BD
W56QE0	W62MH7	W73RE1	W80SK7	W806UT
W56U1N	W62MH9	W73R3S	W80SW7	W8066B
W56W8L	W62MK8	W74LSD	W80SYP	W807NA
W56W8M	W62MLA	W74LSR	W80TP4	W8071K
W57EPS	W62MLG	W80AAM	W80TWT	W8078L
W57KFP	W62M49	W80BGX	W80UFR	W808GP
W57KFS	W62N0H	W80BTZ	W80UYQ	W808G9
W57KFW	W62N7E	W80BT5	W80U8V	W8080Y
W57LVB	W62N7J	W80CK3	W80VZX	W809JD
W57TBQ	W62PN4	W80DSS	W80WKN	W81ALR
W57X08	W62PX8	W80ENT	W80WLG	W81ALT
W57X09	W62R16	W80E01	W80WPA	W81BY9
W58CEU	W62SN6	W80E24	W80WPB	W81CDJ
W58CEV	W62WC5	W80E3S	W80XKD	W81CL8
W58DMS	W62XQ0	W80E3Z	W80XK1	W81C01
W58EDN	W63V0V	W80FL4	W80XLM	W81C52
W58GK1	W63V0W	W80FTD	W80XLN	W81DGN
W58MYQ	W64M5V	W80FTG	W80XYD	W81FE2
W58M0C	W64M5W	W80FXN	W80XYJ	W81F5M
W58M7M	W64PTP	W80GBV	W80X1C	W81H2P
W58NQ5	W65KUC	W80GE8	W80X14	W81LXL
W58VZ1	W66MRR	W80GNP	W80X6T	W81MGL
W58VZ2	W66MR1	W80GWL	W80X71	W81MGM
W59ET8	W66S8K	W80GX9	W80YCJ	W81NLX
W59EUD	W66VDC	W80G1P	W80YDB	W81NY4
W59LWG	W67K2Q	W80G90	W80YDF	
W59LW4	W67K3L	W80HAM	W80YDT	
W59NLA	W67K3M	W80HGJ	W80YJ7	
W59TLY	W68EVQ	W80HYK	W80YJ8	
W59TYC	W68GZL	W80H12	W80YMP	
W59TYK	W68GZM	W80H2B	W80YMY	
W61DBX	W68G0B	W80H2X	W80YM0	
W61DB9	W68G0E	W80H27	W80YN1	
W61DEC	W68G0F	W80H3J	W80YPY	
W61DEV	W68G0G	W80H30	W80YR0	
W61LP3	W68G01	W80H31	W80YR1	
W61LP5	W68HVD	W80H4D	W80YTJ	
W61LP6	W68KCX	W80H44	W80YUD	
W61PKJ	W68KCY	W80H45	W80YUE	
W61SQN	W68L0K	W80JNL	W80YY7	
W61SQQ	W68L0L	W80KWM	W80Y0P	
W62AUL	W68MEE	W80MLC	W80Y42	
W62C9P	W68NES	W80NDT	W800DF	
W62DAW	W68NE1	W80ND2	W800DG	
W62DAZ	W68NE2	W80NEC	W800EE	
W62DBN	W68NE3	W80NRK	W800LB	
W62KNC	W68N9X	W80PAT	W800UR	
W62KND	W68PPA	W80PAU	W8011H	
W62KNE	W68RZ2	W80QJK	W802EU	
W62KNG	W68RZ5	W80Q7W	W802FX	
W62KN5	W73BF0	W80Q8B	W804GC	

APPENDIX C

MISSED CONSOLIDATION PERCENTAGES

APPENDIX C
MISSED CONSOLIDATION PERCENTAGES

The Missed Consolidation Percentage (MCP) was calculated by dividing the number of Government Bills of Lading (GBL) that should have been consolidated, but were not, by the total number of GBLs. These numbers were derived using information from the Materiel Release Order (MRO) file in the following manner. First, Transportation Control Numbers (TCN) were summed by GBL to determine the weight of the shipment. Those greater than 25,000 pounds were eliminated since they are considered Truckload (TL). Second, the remaining GBLs were sorted by offer date to transportation and ship date. The number of GBLs offered between the offer date and the last ship date for each offer were summed. This assumed that all the GBLs offered between the offer date and the last ship date should have been consolidated into one GBL. Finally, the MCP can be calculated and would be:

$$MCP = \frac{(\text{Number of GBLs}) - 1}{(\text{Number of GBLS})} = 1 - (1 \ / \ \text{Number of GBLs})$$

The MCP was calculated for each possible offer date. A possible offer date is the first offer date past the last ship date from the previous offer date. An examination of the offer date to transportation and ship dates revealed that some GBLs were being "held" in transportation for an excessive amount of time i.e. greater than 5 days. When there was excessive hold time the ship date was adjusted to be 5 days after the offer date to transportation.

A weighted mean MCP was calculated based on the number of GBLs. This MCP included instances where a single GBL was offered and shipped with no other GBLs offered during the period. Table C-1 shows the MCPs calculated for each depot by Regional Freight Consolidation Center (RFCC) region. Figure C-1 shows the RFCC regions and the location of the DLA depots represented by the circles.

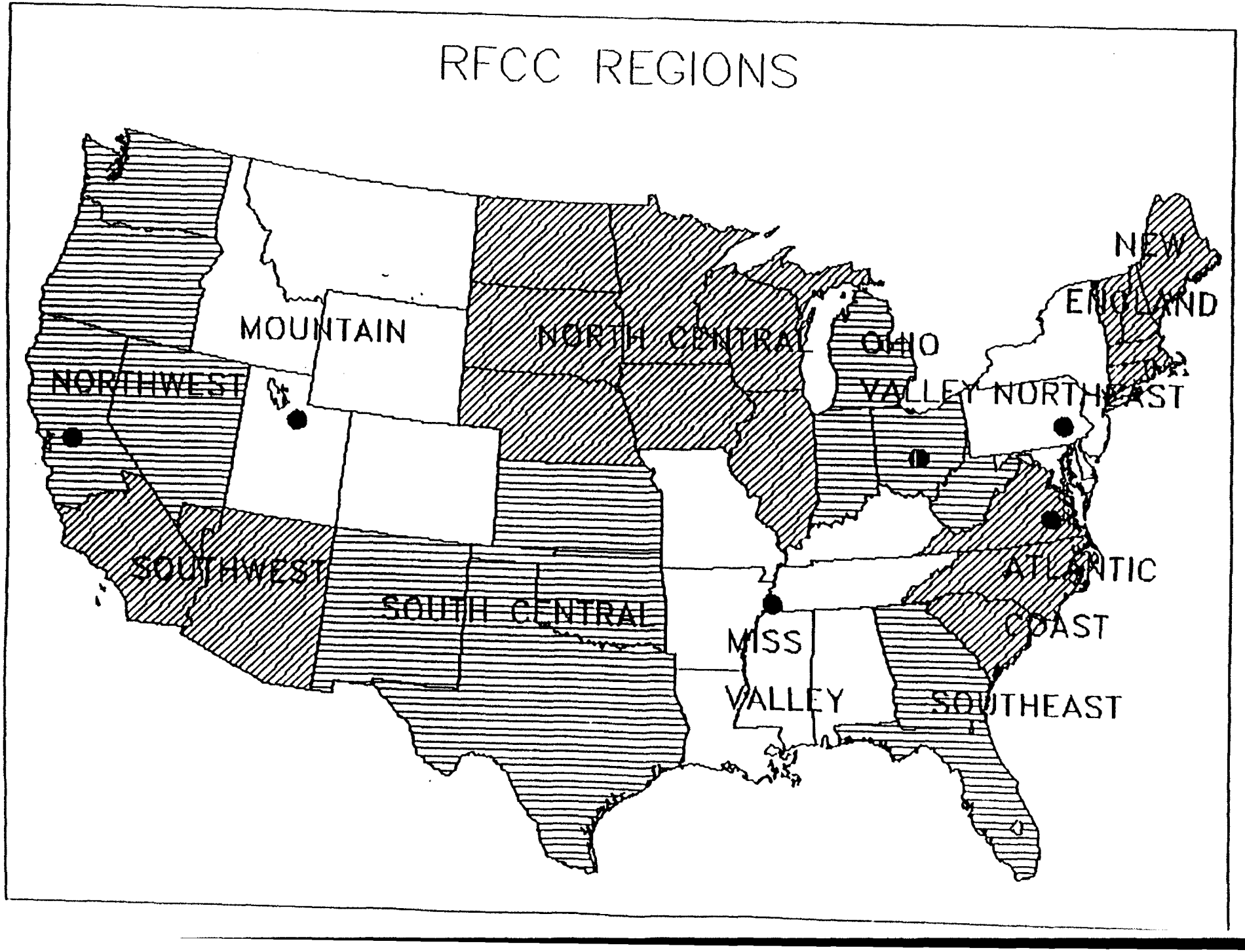
Table C-1. Weighted Mean Missed Consolidation Percentages

RFCC REGION	DDHP	DDSC	DDCO	DDMT	DDRV	DDOU
NE	23.91	15.75	16.17	20.74	23.60	12.56
NO	25.02	11.45	18.14	21.80	29.41	19.43
AC	20.10	20.19	31.88	31.39	37.20	26.73
SE	29.32	19.96	32.54	37.83	50.83	31.58
OV	15.10	9.23	13.68	25.80	15.52	4.35
MV	27.47	17.60	36.88	33.20	43.16	28.34
NC	18.70	12.40	25.62	28.50	19.20	19.44
SC	28.94	26.66	51.63	39.57	43.42	29.41
MT	23.11	20.04	24.79	32.13	22.26	31.11
NW	14.57	33.95	17.64	29.02	16.83	13.85
SW	13.06	35.16	20.39	29.63	17.98	14.47

REGION LEGEND:

NE	NEW ENGLAND
NO	NORTHEAST
AC	ATLANTIC COAST
SE	SOUTHEAST
OV	OHIO VALLEY
MV	MISSISSIPPI VALLEY
NC	NORTH CENTRAL
SC	SOUTH CENTRAL
MT	MOUNTAIN
NW	NORTHWEST
SW	SOUTHWEST

Figure C-1. RFCC Regions



APPENDIX D

DEPOT WORKLOAD IMPACT

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

IN REPLY REFER TO DLA-OWO (Don Neri, 703/617-7883/asn)

29 JUL 1992

SUBJECT: Direct Support System (DSS) Time Standards

TO: DDRE-T, DDRC-T, DDRW-T, DDOU-T

1. The DLA Operational Research Office (DORO) is currently conducting an analysis to determine the economical and operational impacts of implementing DSS time standards at all DWASP/DDS depots for DSS CONUS customers. Your assistance in this effort will be helpful.

2. In DORO's most recent IPR, they identified the average number of DSS CONUS lines handled by each depot on a daily basis (Encl 1). Under current operating policy, all IPG III requisitions received at DWASP/DDS depots from DSS CONUS customers are banked and processed in accordance with IPG III UMMIPS time standards. If we adopt DSS time standards (Encl 2) for DSS CONUS customers, we would not bank these requisitions. Instead, we would free flow them and essentially treat them as IPG I's for depot processing purposes. For the most part, transportation of these requisitions would be via surface mode.

3. At this point of the analysis, we want DORO to focus on the operational/economic impact this shift of workload (IPG III to IPG I) would have on the depots. To assist DORO in this effort, your comments are requested. Specifically, request you identify those areas you believe will be impacted and the way in which they will be impacted. DORO can then attempt to quantify the extent of impact.

4. A response by 7 August 1992 will be greatly appreciated.

Gary Hartnack

Chief, Operations & Systems Branch
Depot Operations Division
Supply Operations

2 Encls

DSS WORKLOAD

(JUNE - DEC 91)

DEPOT	AVG DSS LINES/DAY
DDSP (Mechanicsburg Facility)	722
DDJC (Tracy Facility)	835
(Sharpe Facility)	* Not Available
DDOC	* Not Available
DDCO	1,225
DDMT	2,835
DDRV	1,184
DDOU	1,355

* Assessment of impact to be based on locally developed workload statistics.

DSS - CONUS TIMEFRAMES

PIPELINE SEGMENT	STANDARD (DAYS)
Depot Processing	5
Intransit	2
TOTAL	7

DEFENSE LOGISTICS AGENCY
DEFENSE DISTRIBUTION REGION EAST
DEFENSE DISTRIBUTION DEPOT SUSQUEHANNA
NEW CUMBERLAND, PA 17070-5001

IN REPLY REFER TO DDRE-T

07 AUG 1992

SUBJECT: Direct Support System (DSS) Time Standards

TO: DLA-OWO
ATTN: Don Neri

1. Reference: DLA-OWO letter, 29 July 1992, subject as above.

2. In accordance with referenced letter, DDRE has reviewed the DSS Time Standards and submits the following comments:

a. It has not in the past been policy to honor DSS requirements from DLA depots for CONUS customers. As a result, those customers were placed into their respective geographic areas for workload planning purposes and their workload is planned along with all other customers within that geographic area. In order to attain DSS time standards, it would be necessary to identify those DSS customers, to move them to their own geographic area, and to accomplish a DWASP workload pull on that geographic area daily.

b. Pulling any geographic area daily causes a negative impact on the mission. It makes it difficult to level and manage the workload out of the bank; there is a diminished amount of control over the daily workload pull to accommodate "shift days," days before and after holidays when the workforce is traditionally limited.

c. Savings that are currently achieved through the consolidation of workload into large shipment units and subsequently into large transportation units are lost. The result will be an increase in single line shipment units that are going to all parts of CONUS. This will certainly result in an increase in the number of small boxes being processed through the freight terminal and an increase in the number of boxes being shipped through a small parcel carrier. There will certainly be an increase in the Second Destination Transportation costs. Additional costs will be incurred in the warehouse areas for packing supplies and to accomplish an increased number of CRT actions through DWASP.

d. Efficiencies gained through geographic area workload pulls will be lost, dedicated trucks will be limited, and an increase in LTL traffic will be realized.

3. Currently, the functional requirements submitted for the Distribution Supply System (DSS) do not recognize any Direct Support System requirements for CONUS customers, only for OCONUS. Functional requirement changes will be necessary if this service is to be offered from any DLA depot.

CHARLES E. NYE
Director of Distribution

DEFENSE LOGISTICS AGENCY
DEFENSE DISTRIBUTION REGION CENTRAL
2163 AIRWAYS BOULEVARD
MEMPHIS, TENNESSEE 38114-5210

IN REPLY REFER TO

DDRC-TM

14 AUG 1992

SUBJECT: Direct Support System (DSS) Time Standards

TO: DLA-OWO
ATTN: Don Neri

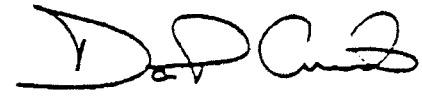
1. Reference DLA-OWO letter, 29 Jul 92, subject as above.

2. The immediate impact at the DDRC DWASP/DDS depot (DDMT Memphis) if DSS requisitions are free flowed is a sharp reduction in the visibility of managed workload. DDMT has altered employee work schedules, eliminated the Sunday work shift and reduced both the Saturday and night shift operations as labor saving measures and as a result of a closely managed workload. The success of workload planning is predicated on the ability to review the workload bank, increase consolidated shipment units and release the workload commensurate with the staffing of the workforce. While accomplishing this, two factors already affect the current workload scheduling to some degree. They are the Medical Z documents and dedicated truck requisitions. Both are manageable however, DDMT does have some spikes in their daily workload drops in which they must use overtime or carry over workload. Additional costs will be incurred in the transportation field because shipment consolidation will be by-passed. This would cause a more fragmented shipping mode using more small parcel carriers. If this occurs, DDMT would be paying approximately 35 cents per shipping pound versus the 9 cents per shipping pound for planned freight shipments. We are also concerned that the pipeline segment measurements could affect the mode of shipments. If the depot processing time is fully utilized in operations, the two day intransit time in most cases could only be accomplished using air shipments versus surface made as indicated in paragraph 2 of your letter.

3. Our major concern regarding your letter is the genesis of this program. What are we trying to accomplish with the free flow system that can't be done using normal requisition processing timeframes and the priority system? Our review of the Army workload history indicated very difficult problems with managing

and controlling their workload. Very heavy backlogs were generated at the Army depots and we're not certain what impact the DSS workload had with the problem however, we don't want to see that duplicated at the DWASP/DDS depots. The free flow system can be accomplished but the benefits derived from this program are questionable.

4. The DDRC-T point of contact is Phil Amido, DDRC-TMP, (DSN) 683-6824.



C~ A. B. BAILEY
Chief, Distribution Management Division

DEFENSE LOGISTICS AGENCY
DEFENSE DEPOT OGDEN
OGDEN, UTAH 84407-5000

IN REPLY REFER TO DDOU-T(TMP) (K. Manisco/DSN 352-7584/nv)

AUG 20 1992

SUBJECT: Direct Support System (DSS) Time Standards

TO: DLA-OWO
ATTN: Don Neri

1. Reference DLA-OWO letter dated 29 Jul 92, subject above.

2. Based on the information provided, the economic impact on DDOU to provide the services requested would be significant. The cost to process 1,355 individual IPG III lines as IPG I's per day is as follows:

a. Warehousing Division, Ogden Facility: To pick, pack, and transport to transportation = 184 additional hours x $11.70 hourly rate = $2,152.80.

b. Transportation = 90 additional hours x $9.61 hourly rate = $864.90, 45 hours x $10.87 hourly rate = $488.15.

c. Total cost per day would be $3,506.85.

3. An alternative is to request Army personnel to input the correct priority designator and RDD which will automatically generate an IPG I.

4. Another approach is to task DSAC personnel to develop a change to the existing legacy system which would capture and upgrade IPG III MRO requests at the point of entry so they would be printed as IPG I's.

5. The POC for this action is Karon Manisco, DDOU-TMP, DSN 352-7584.

O. E. JORGENSON
Deputy Director
Directorate of Distribution

Performance Through Teamwork

DEFENSE LOGISTICS AGENCY
DEFENSE DISTRIBUTION REGION WEST
P.O. BOX 960001
STOCKTON, CA 95296-0106

IN REPLY REFER TO DDRW-TMPS (Ms. Green/DSN462-9363/kp) 26 AUG 1992

SUBJECT: Direct Support System (DSS) Time Standards

TO: DLA-OWD

1. Reference: DLA-OWD letter, 29 July 1992, subject as above.

2. DDRW-T estimates an additional processing cost of $30,707 per week and an increase of four full-time equivalents (FTE) at DDJC-Tracy Facility, based upon the following:

a. Currently we are attaining 77.4% multi lines and 22.6% single lines for routine shipments by banking our IPG III workload and releasing per an established schedule.

b. Hi pri's, which are freeflowed, are currently 52.4% multi lines and, 47.6% single lines.

c. If DSS IPG III's are freeflowed rather than banked, workload will take on same percent of single lines as hi pri's, i.e., we will lose 25% of our multi line consolidation.

d. Shipping costs of hi pri's currently average $12.77 per line whereas shipping cost of IPG III's utilizing the banking system average $4.66 per line. Based on volume provided, by reference, freeflowing DSS would cost an additional $47,402.95 in shipping costs per week.

e. Freeflowing DSS would result in 1,461 more single lines per week. Consequently labor involved would increase by 32 hours per week. Based on WG-05/3 average wage of $32.04 per hour, including overhead and benefits, the extra single lines would cost an additional $1,025 for shipment processing.

f. An additional cost of $2,279 in packaging supplies would be incurred, due to a 25% increase in use of containers.

26 AUG 1992

DDRW-TMPB PAGE 2
SUBJECT: Direct Support System (DSS) Time Standards

3. During April, May, and June of 1992, the average percent of incoming routine lines that entered the bank were: Monday-4.8%; Tuesday-9.9%: Wednesday-14.7%: Thursday-16.7%: Friday-19.8%; Saturday-13.5%; and Sunday-15.6%. Freeflowing these lines would not allow us to bank them on weekends and control their release Monday thru Friday. Saturday and Sundays orgo would be increased by approximately 1,000 lines a day. A staffing shift in transportation, warehousing, shipping, systems and equipment support would be necessary of approximately 16 additional personnel for Saturday and Sunday. (Workload control is a balance between transportation, warehousing, shipping, systems. and equipment support). In addition to the cost cited in paragraph 2 of $50,707 per week an additional payroll increase for four FTE's would be realized by having to pay 16 personnel 25% differential pay on Sunday.

4. Freeflowing DSS lines that we are currently banking would diminish our capability to project staffing requirements. Using banking as a tool to provide cost effective planning allows us to fully utilize our managerial capabilities.

A. E. STEIGELMAN
Captain, SC, USN
Acting Director of Distribution

APPENDIX E

DSS IMPACT ON DEPOT WORKLOAD

APPENDIX E

Table E-1. DSS Impact On Depot Workload

DSS IMPACT ON DEPOT WORKLOAD
JUNE 1 THROUGH DECEMBER 31, 1991

DEPOT	AVG TOTAL LINES/DAY[1]	AVG IPG 1 LINES/DAY[2]	AVG DSS LINES/DAY	TOTAL IPG 1 & DSS LINES/DAY	PERCENT INC IN IPG 1 LINES/DAY
DDHP	11,235	1,367	473	1,840	34.60%
DDSC	11,121	1,604	536	2,140	33.42%
DDCO	8,026	1,384	783	2,167	56.58%
DDMT	14,302	2,000	1,872	3,872	93.60%
DDRV	10,133	1,679	800	2,479	47.65%
DDOU	9,985	1,647	905	2,552	54.95%
TOTALS	64,802	9,681	5,369	15,050	55.46%

NOTES:

[1]The average total lines/day is based on a 5 day work week.

[2]The average IPG 1 lines/day is based on a 6 day work week.

APPENDIX F

CALCULATIONS OF DEPOT PROCESSING COSTS

APPENDIX F

Table F-1. Calculations of Depot Processing Costs

DEPOT	AVG DSS LINES	** WAREHOUSING ** HOURS(W)	COST(W)	********** TRANSPORTATION ********** HOURS(T1)	COSTS(T1)	HOURS(T2)	COST(T2)	PACKAGING
DDSP (Mechanicsburg)	560	76.0	$889	37.3	$358	18.7	$219	$306
DDSC (Tracy)	650	88.3	$1,033	43.3	$416	21.7	$254	$139
DDCO	927	126.0	$1,474	61.8	$594	30.9	$362	$198
DDMT	2,216	301.1	$3,523	147.7	$1,419	73.9	$865	$472
DDRV	947	128.7	$1,506	61.1	$587	31.6	$370	$202
DDOU	1,072	145.7	$1,705	71.5	$687	35.7	$418	$228
TOTAL			$10,130		$4,061		$2,488	$1,545

TOTAL AVG DSS LINE PROCESSING COST PER DAY $18,224

ANNUALIZED COST $4,574,224

Warehousing calculations:

1355 Avg DSS lines / 184 hours[1] = 7.36 lines per hour
HOURS(W) = (AVG DSS LINES) / 7.36 COST(W) = HOURS(W) X $11.70[1]

Transportation calculations:

1355 Avg DSS lines / 90 hours[2] = 15 lines per hour
HOURS(T1) = (AVG DSS LINES) / 15 COST(T1) = HOURS(T1) X $9.61[2]

1355 Avg DSS lines / 15 hours[2] = 30 lines per hour
HOURS(T2) = (AVG DSS LINES) / 30 COST(T2) = HOURS(T2) X $11.70[2]

Packaging calculations:

$2,279 per week[3] / 5 = $456 cost per day
$456 / 835 Avg DSS lines = $.5461 Avg additional packaging cost per DSS line

Packaging cost per day = (AVG DSS LINES) X ($.5461)

Annual cost calculations:

$25,599	Avg per day cost
X 251	Working days per year
$6,425,349	Annual costs

Working days per year calculations:

365	days per year
- 104	Saturdays and Sundays per year
- 10	Holidays
251	working days per year

[1] Additional hours and hourly rate provided by DDOU, IOM subject Direct Support System (DSS) Time Standards, 20 Aug 1992, paragraph 2.a.

[2] Additional hours and hourly rate provided by DDOU, IOM subject Direct Support System (DSS) Time Standards, 20 Aug 1992, paragraph 2.b.

[3] Additional packaging cost provided by DDRW, IOM subject Direct Support System (DSS) Time Standards, 26 Aug 1992, paragraph 2.f.

APPENDIX G

CALCULATION OF PIPELINE COSTS

APPENDIX G
DSS ANALYSIS CALCULATIONS OF PIPELINE COSTS

The calculation of Army's DLA pipeline cost is broken down into four steps. First, the proportion of the average daily dollar value (ADDV) of the pipeline for CONUS is determined. Second, the ADDV of the pipeline for CONUS DSS is determined. Third, the ADDV is summed for the source of supply as being DLA and the supply class as being those used by DSS units. Finally, the summed ADDV in step 3 is muliplied by the proportions giving an estimated of the ADDV for the Army's DLA DSS pipeline cost. These calculations are given below.

(1) Calculation of the CONUS proportion:

	AVERAGE DAILY DOLLAR VALUE	PROPORTION
CONUS TOTAL	$46,712,795.55	.898033
OVERSEAS TOTAL	$5,304,005.25	.101967
TOTAL	$52,016,800.80	

(2) Calculation of the CONUS DSS proportion:

	AVERAGE DAILY DOLLAR VALUE	PROPORTION
SUBTOTAL NON-DSS, CONUS	$39,221,619.48	.844549
SUBTOTAL DSS, CONUS	$7,219,275.30	.155451
CONUS TOTAL	$46,440,894.78	

(3) Calculations of the DLA DSS supply class total ADDV.

SOURCE OF SUPPLY	CLASS	AVERAGE DAILY DOLLAR VALUE
DLA	2	$1,327,692.45
DLA	3	90,823.82
DLA	4	66,304.73
DLA	5	
DLA	7	52.57
DLA	8	905,418.18
DLA	9	1,393,939.42
TOTAL		$3,784,231.17

(4) Calcualtion of ADDV for DSS requisitions.

A. PROPORTION OF CONUS ADDV =

TOTAL DLA ADDV X PROPORTION OF TOTAL

= $3,784,231.17 X .898033 = $3,398,364.47

B. CONUS DSS ADDV =

PROPORTION OF CONUS ADDV X DSS PROPORTION

= $3,398,364.47 X .155451 = $528,279.16

The DSS classes of supply are listed below:

CLASS	DISCRIPTION
II	CLOTHING, INDIVIDUAL EQUIPMENT, TOOLS, ADMIN SUPPLIES
III	PACKAGED PETROLEUM ONLY
IV	CONSTRUCTION MATERIEL
V	MISSILE COMPONENTS ONLY
VII	MAJOR END ITEMS
VIII	MEDICAL MATERIEL
IX	REPAIR PARTS

SOURCES

DSS CLASSES OF SUPPLY

FM 38-725, DIRECT SUPPORT SYSTEM (DSS) & AIR LINE OF COMMUNICATION (ALOC) MANAGEMENT & PROCEDURES, HEADQUARTERS, DEPARTMENT OF THE ARMY, WASHINGTON, DC, SEPTEMBER 1990

DOLLAR VALUE OF THE ARMY LOGISTIC PIPELINE

DOLLAR VALUE OF THE ARMY LOGISTIC PIPELINE STRATIFIED BY MAJOR ARMY COMMAND, HEADQUARTERS, DEPARTMENT OF THE ARMY, UNITED STATES ARMY DARCOM LOGISTIC CONTROL ACTIVITY, PRESIDIO OF SAN FRANCISCO, CA, 6 JUL 1992

APPENDIX H

COST ANALYSIS

APPENDIX H
COST ANALYSIS

This appendix shows the calculations for the cost analysis of two scenarios. The first cost analysis is for depot processing as IPG 1 and ship surface freight. The second cost analysis is for depot processing as IPG 1 and ship surface freight if less than 400 miles or ship 2nd day air if more than 400 miles from the depot.

(1) DEPOT PROCESSING AS IPG 1 AND SHIP SURFACE FREIGHT

Savings = Reduction in Average OST X Average Daily Dollar Value of the pipeline

= 8.3 days X $.528 million/day

= $4.4 million

Total Additional Cost = $4.8 million

(A) CURRENT DOLLARS (IN MILLIONS)

YEAR	SAVINGS	YEARLY ADDITIONAL COST	NET	CUMULATIVE ADDITIONAL COST	NET
1	$4.4	$4.8	$0.4	$4.8	$ 0.4
2		$4.8	$4.8	$9.6	$ 5.2
3		$4.8	$4.8	$14.4	$10.0
4		$4.8	$4.8	$19.2	$14.8
5		$4.8	$4.8	$24.0	$19.6
6		$4.8	$4.8	$28.8	$24.4
7		$4.8	$4.8	$33.6	$29.2
8		$4.8	$4.8	$38.4	$34.0
9		$4.8	$4.8	$43.2	$38.8
10		$4.8	$4.8	$48.0	$43.6

TOTAL 10 YEAR ADDITIONAL COST = $43.6 MILLION

(B) NET PRESENT VALUE (IN MILLIONS)

YEAR	SAVINGS	FACTOR	COST	INFLATION FACTOR	NET COST	CUMULATIVE COST
0	$4.4	1	$4.8	1	$0.4	$0.4
1-10			$4.8	6.447	$30.9	$31.3

NET PRESENT VALUE = $31.3 MILLION

(2) DEPOT PROCESSING AS IPG 1 AND SHIP 2ND DAY AIR OR SURFACE FREIGHT

Savings = Reduction in Average OST X Average Daily Dollar Value of the pipeline

= 8.5 days X $.528 million/day

= $4.7 million

Total Additional Cost = $45.9 million

(A) CURRENT DOLLARS (IN MILLIONS)

YEAR	SAVINGS	YEARLY ADDITIONAL COST	YEARLY ADDITIONAL NET	CUMULATIVE ADDITIONAL COST	CUMULATIVE ADDITIONAL NET
1	$4.7	$45.9	$41.2	$ 45.9	$ 41.2
2		$45.9	$45.9	$ 91.8	$ 87.1
3		$45.9	$45.9	$137.7	$133.0
4		$45.9	$45.9	$183.6	$178.9
5		$45.9	$45.9	$229.5	$224.8
6		$45.9	$45.9	$275.4	$270.7
7		$45.9	$45.9	$321.3	$316.6
8		$45.9	$45.9	$367.2	$362.5
9		$45.9	$45.9	$413.1	$408.4
10		$45.9	$45.9	$459.0	$454.3

TOTAL 10 YEAR ADDITIONAL COST = $454.3 MILLION

(B) NET PRESENT VALUE (IN MILLIONS)

YEAR	SAVINGS	FACTOR	COST	INFLATION FACTOR	NET COST	CUMULATIVE COST
0	$4.7	1	$45.9	1	$41.2	$41.2
1-10			$45.9	6.447	$295.9	$337.1

NET PRESENT VALUE = $337.1 MILLION

APPENDIX I

SUMMARY STATISTICS

APPENDIX I
SUMMARY STATISTICS

This appendix contains various summary statistics for this project. These statistics are provided to aid in demonstrating the scope of the project. The significance of each statistic is briefly explained.

Number of DSS units = 660

The number of Army designated DSS units.

Number of final destinations = 259

The number of final destinations includes individual units if not supported by a DCR.

Number of SPLC6s = 232

The number of six position SPLCs where requisitions are delivered.

Number of SPLC4s = 217

The number of four position SPLCs where requisitions are delivered.

Number of requisitions = 936,433

The number of actual requisitions in a 6-month period used to estimate the costs and total times for DSS requisitions.

APPENDIX J

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APPENDIX J
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13. ABSTRACT (Maximum 200 words)

This is an analysis of the United States Army Direct Support System (DSS) performance standards to determine the impact of applying those standards to DSS shipments originating at Defense Logistics Agency (DLA) managed supply depots. The analysis is limited to the six traditional DLA supply depots located at Mechanicsburg, PA, Columbus, OH, Richmond, VA, Memphis, TN, Ogden, UT, and Tracy, CA. A simulation model was used to determine the estimated cost and operational effectiveness associated with four different scenarios. It was recommended that DLA maintain the level of service currently provided to Army DSS customers. While the approach does not meet current DSS standards, it is equivalent to the performance of former Army depots prior to DLA ownership. As a no cost alternative, the Army should consider adjusting DSS objectives to match present performance. One additional method for processing DSS material was proposed which would reduce order-ship-time to meet the DSS standards but would significantly increase DLA's depot and transportation costs.

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